



First NuMI/MINOS Neutrino Beamline and Detector Test Run

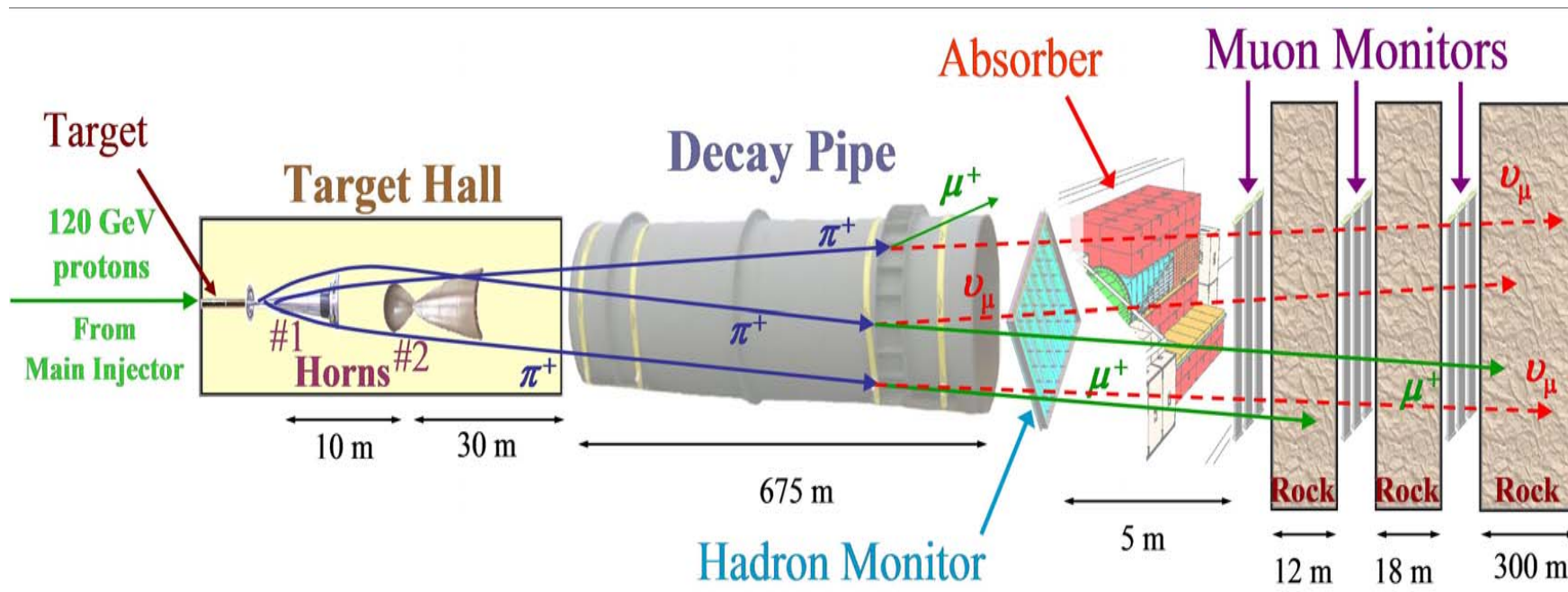
1/21/05-1/23/05



Production of the NuMI Neutrino Beam

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MINOS Control Room White Board Time Line

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- 12:15 MI tune up for NuMI extraction
- 1:15 First protons seen in profile monitors
 - « First pulse made it to the target!
- 2:10 See profiles in all 3 muon alcoves
- 2:45 See first event display
 - « From 2:19 pm beam pulse, 4th pulse with the horns on!
- 3:20 Looking at vertex, timing
- 3:50 Put $>1E12$ protons at the target
- 4:17 $>1E12$ ppp on target
- 4:30 First MiniBooNE visitors to Control Room
- 5:00 Taking data
- 5:15 Celebrate
- 6:10 Target Scans

Saturday: neutrinos & beam studies, Sunday: a few hours horn studies.
(black text added by me)

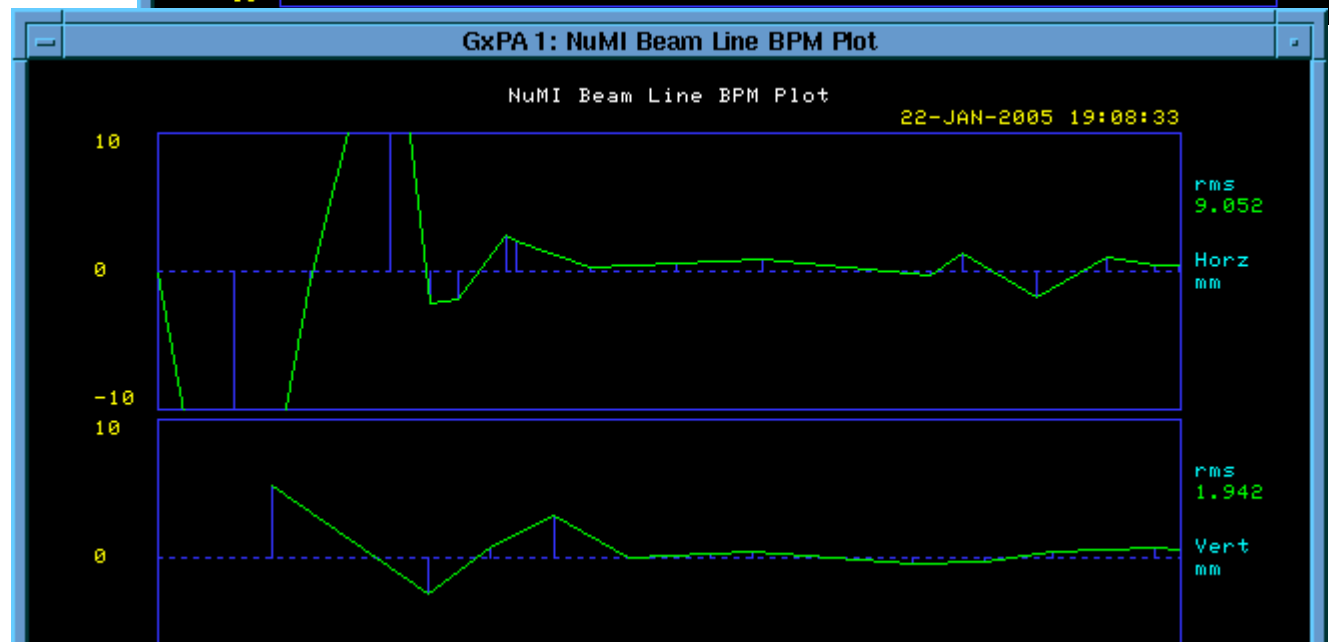
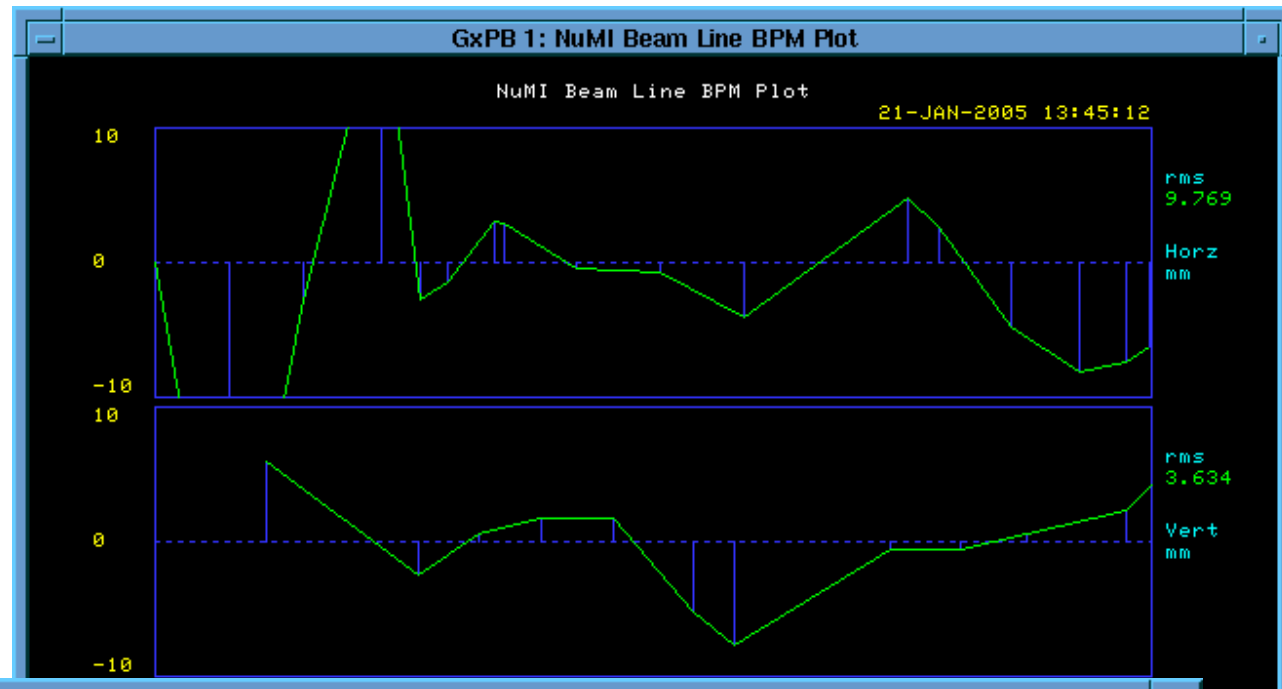


MINOS

Beam Position Monitors

The Second Pulse to
the Target:

After Saturday Beam
tuning:



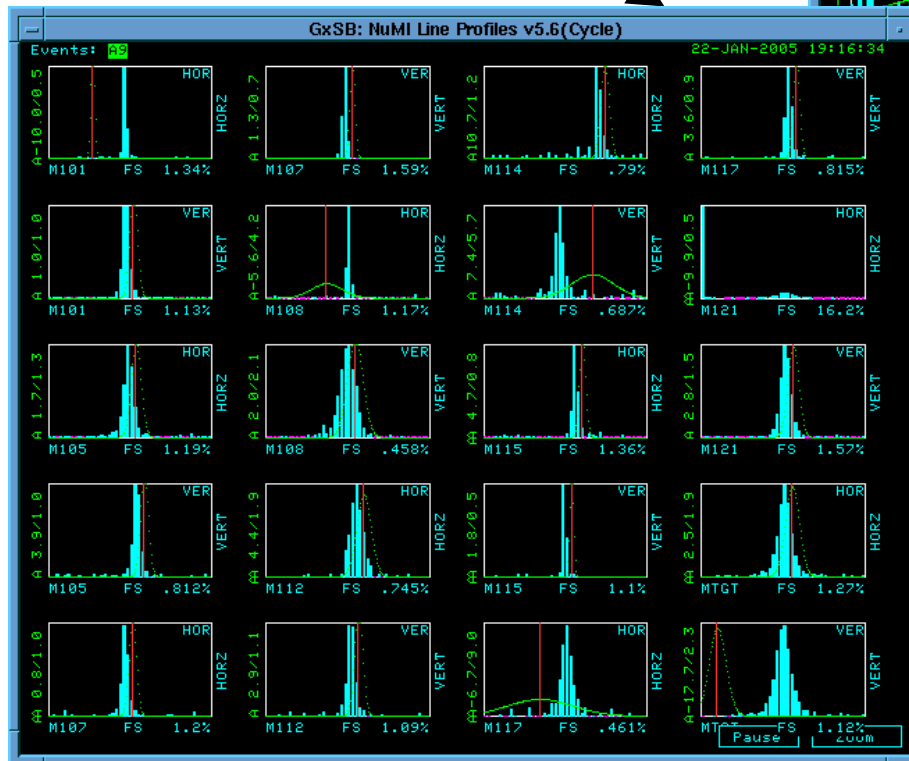
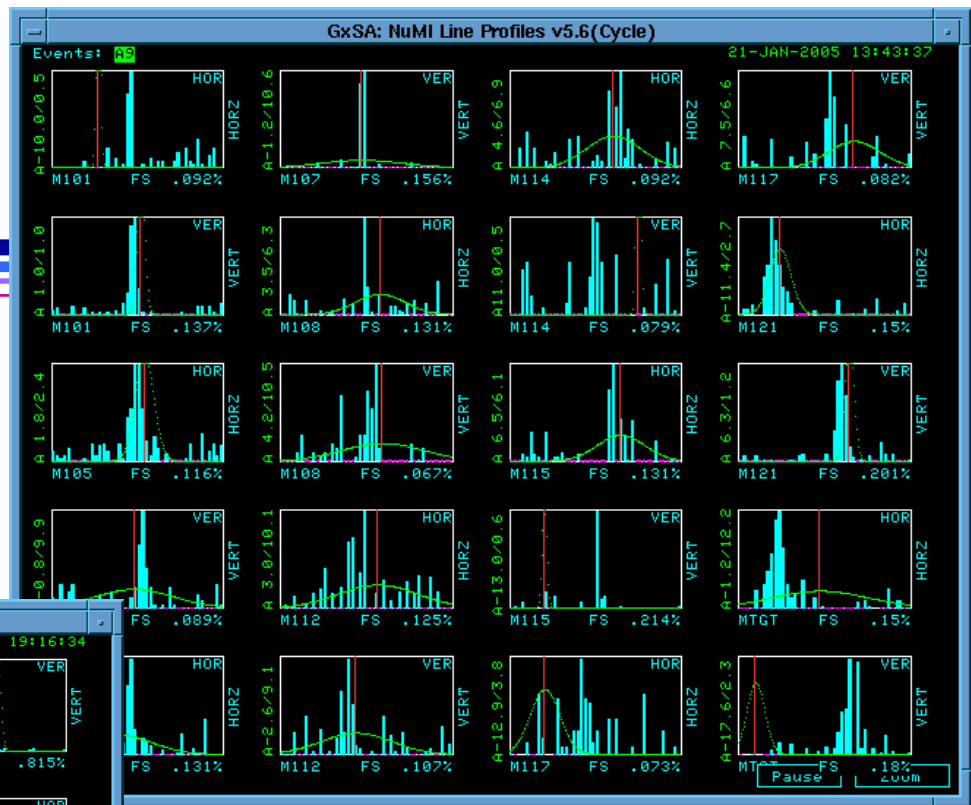


MINOS

Profile Monitors

The Second Pulse to the Target:

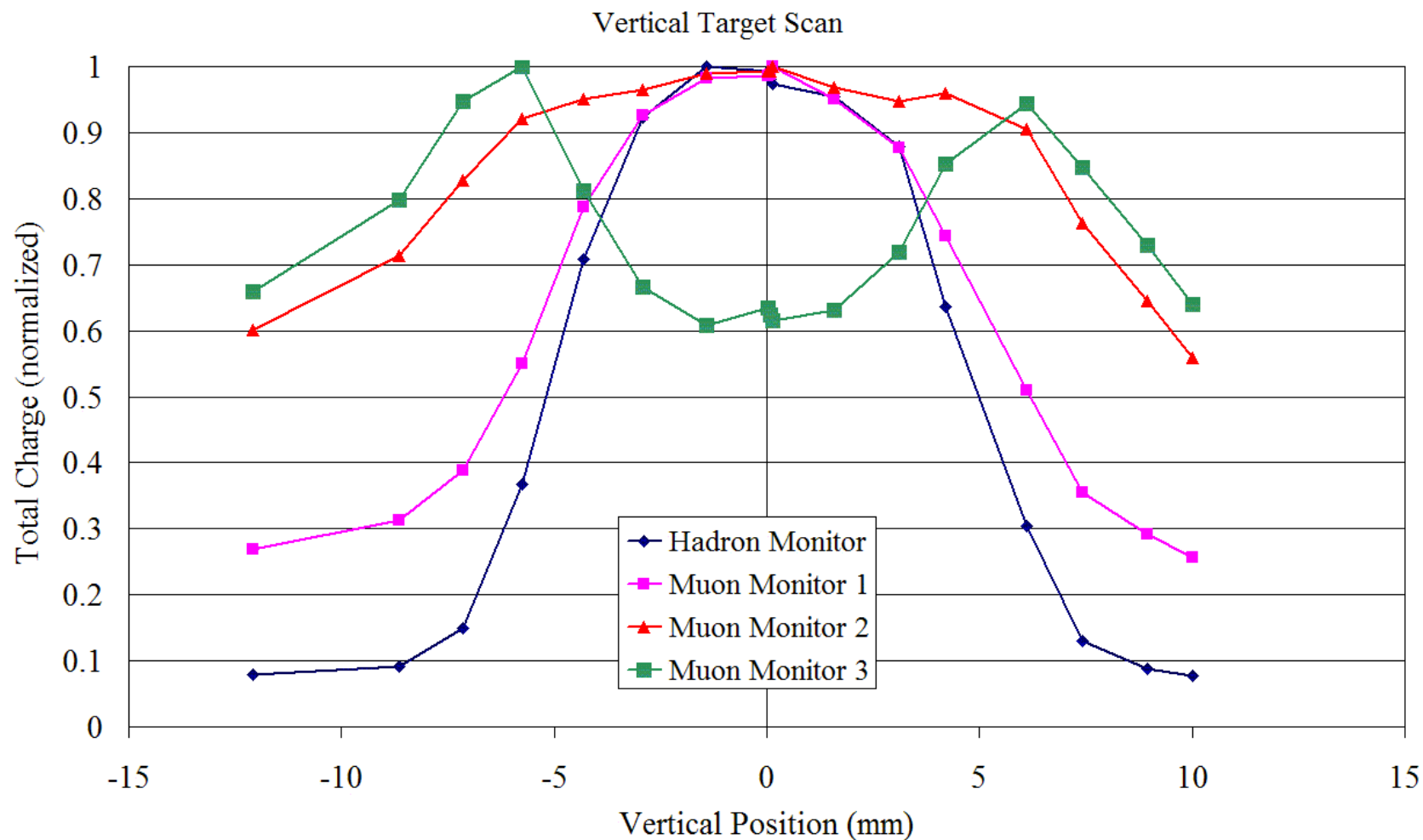
After Saturday Beam tuning:



Target Scan – Vertical (preliminary)

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Target Scan, Muon Monitor Signals (preliminary)

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Muon alcoves located after different amounts of shielding (rock), thus varying effective momentum cutoffs for muons:

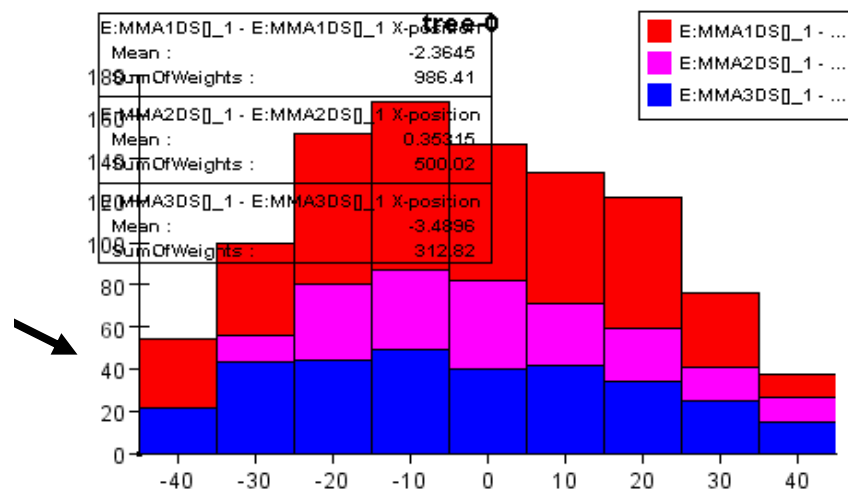
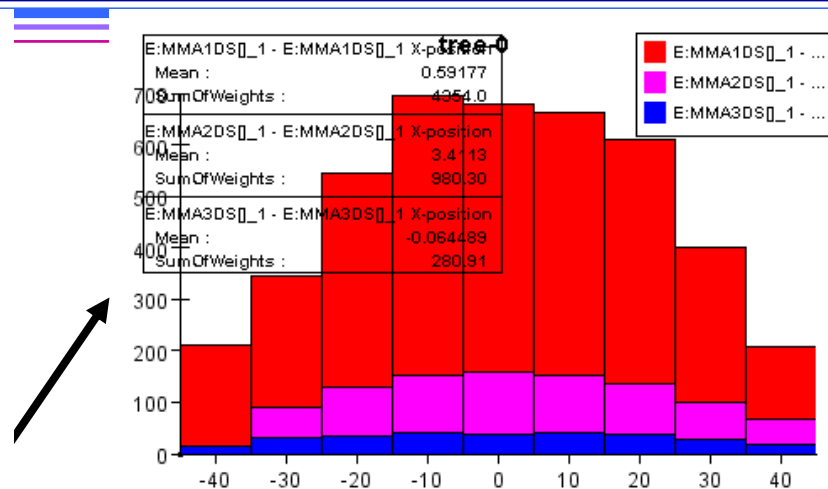
Alcove 1 (red): 4GeV

Alcove 2 (pink): 9GeV

Alcove 3 (blue): 17GeV

Hitting Target (lower energy muons)

Hitting Baffle (higher energy muons)

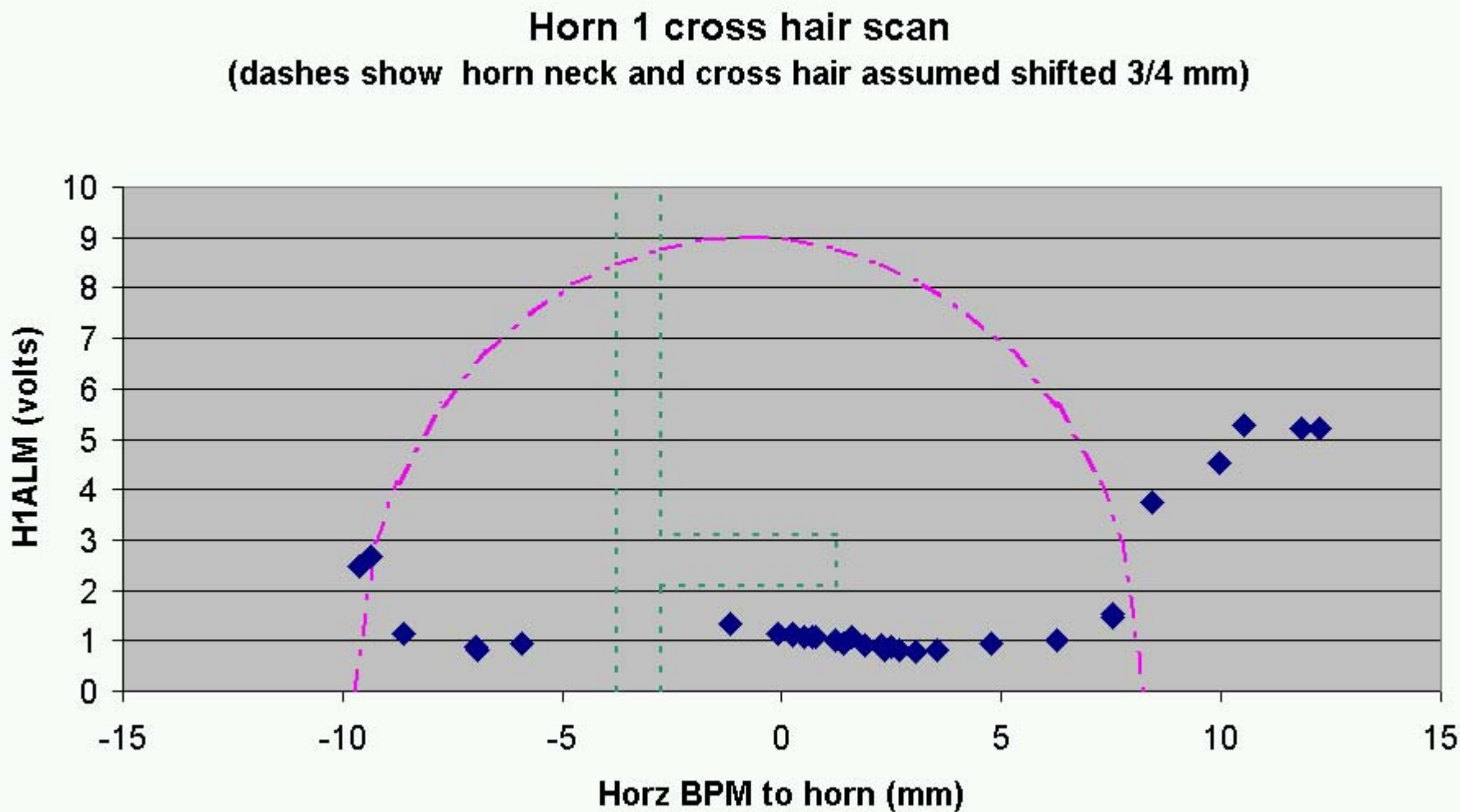




Horn Scan (partial, preliminary)

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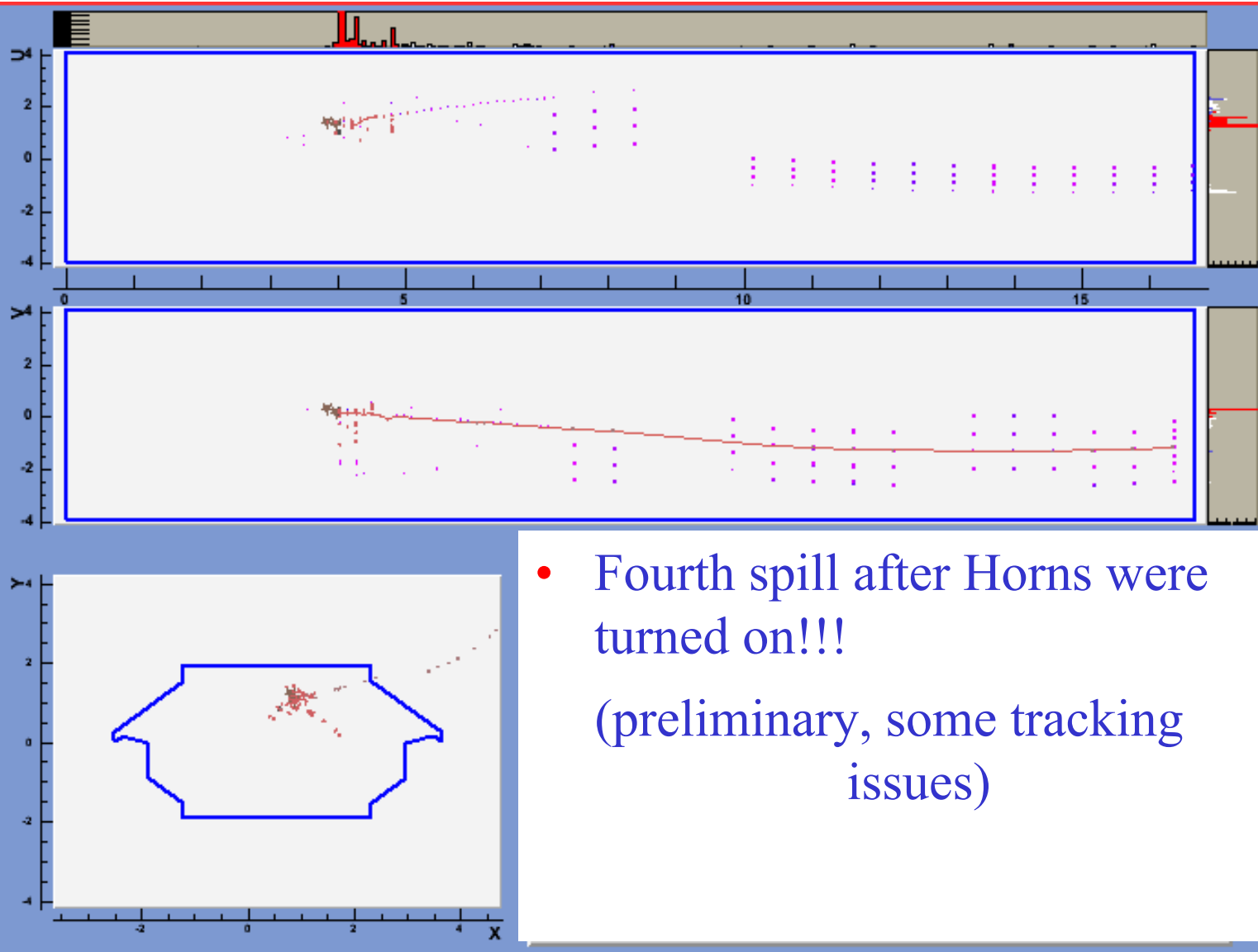


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First Neutrino Event

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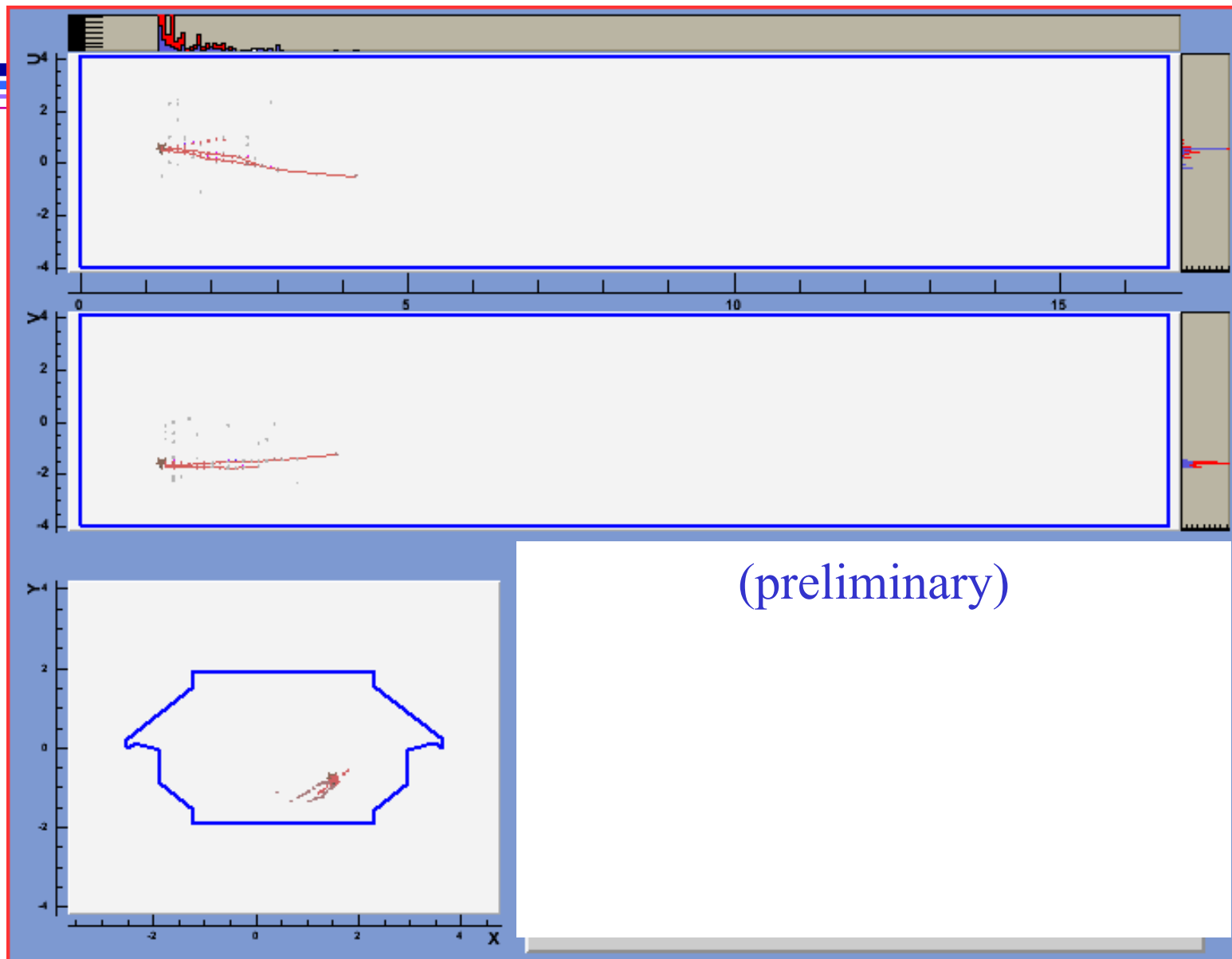




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More (Better) Neutrino Events

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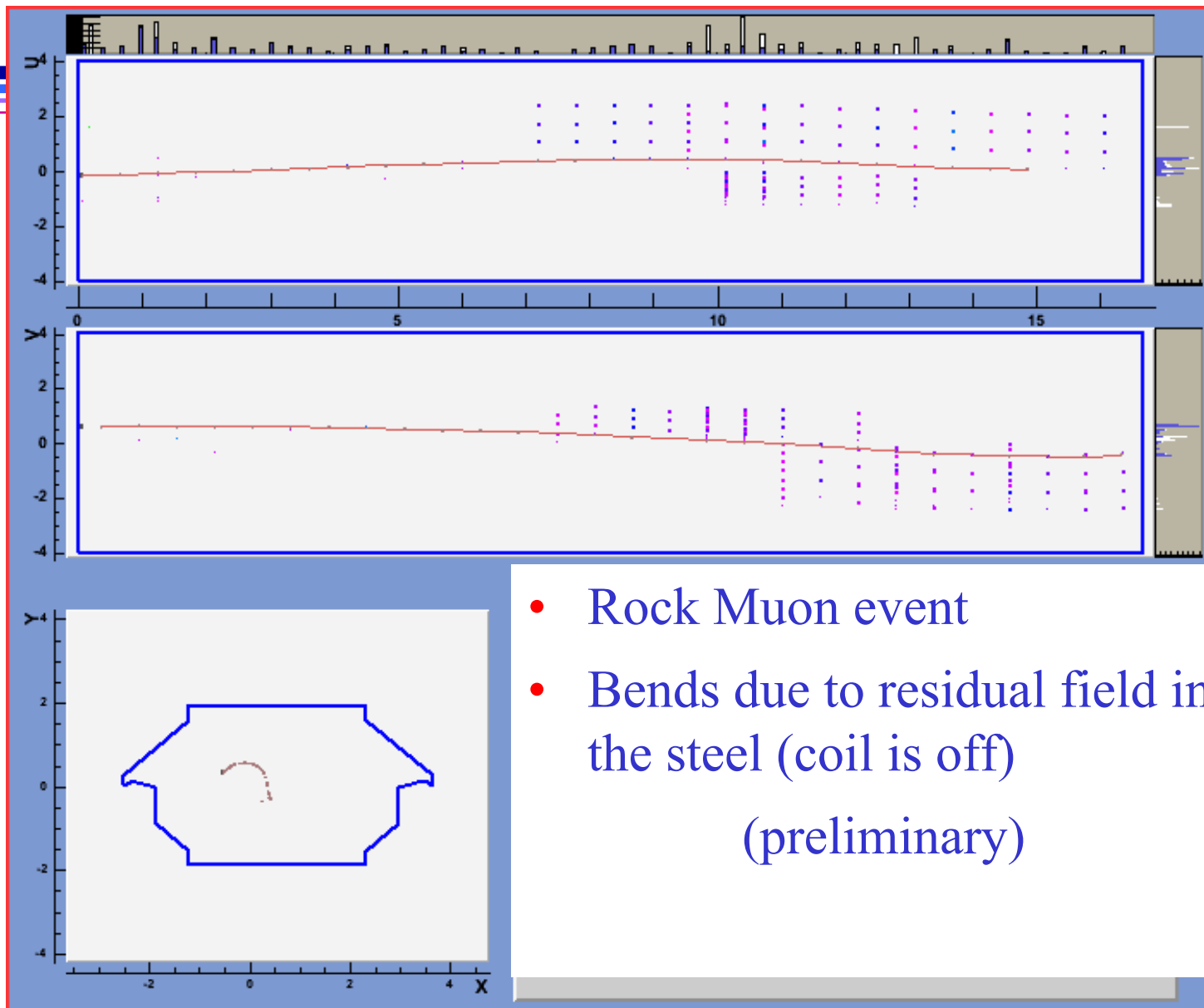




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Rock Muon Event

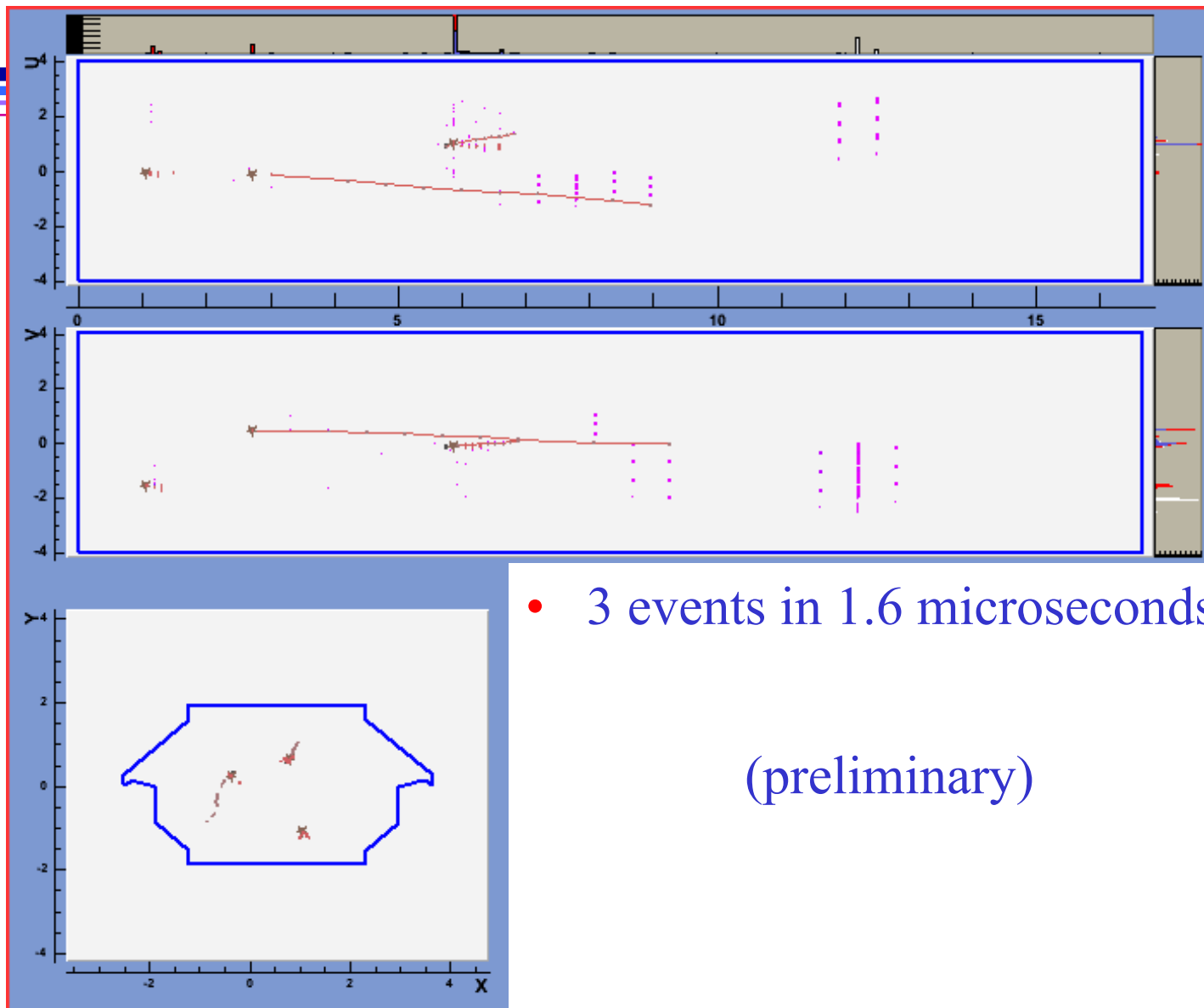
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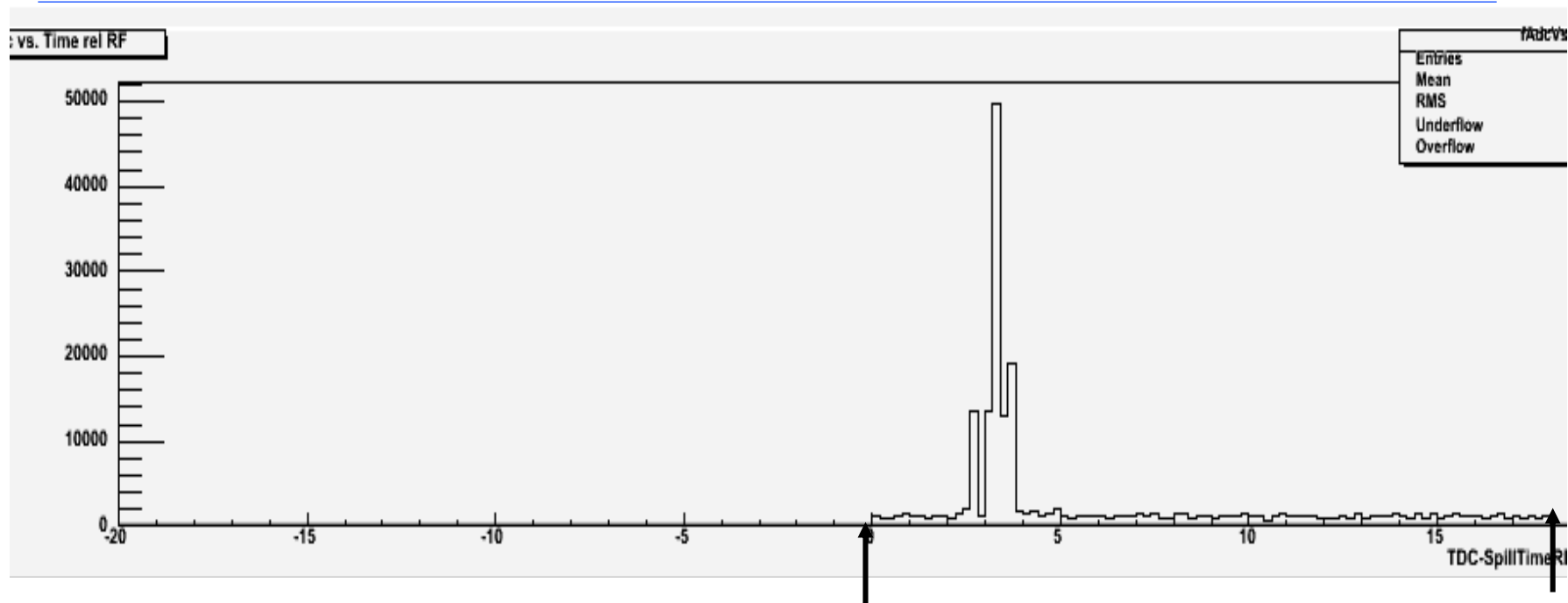
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3 Events





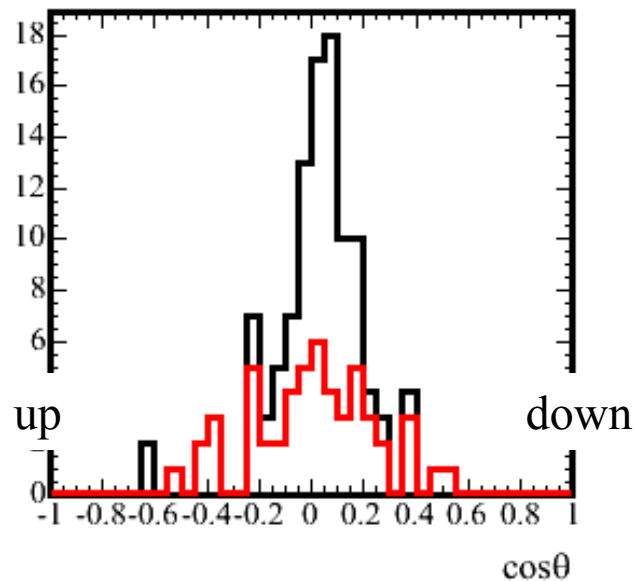
Triggers/Timing (preliminary)



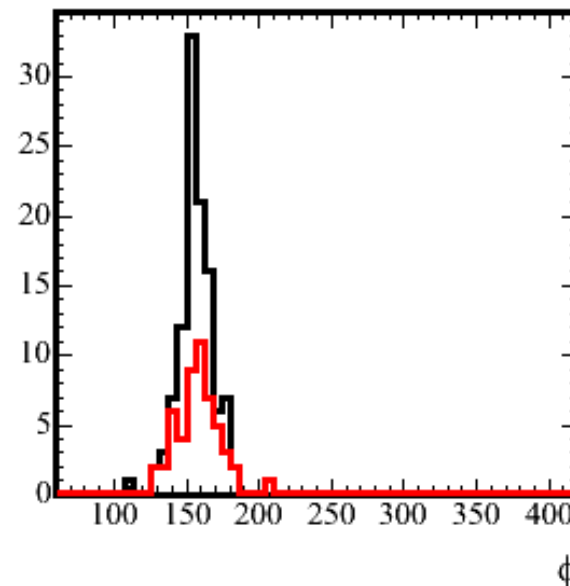
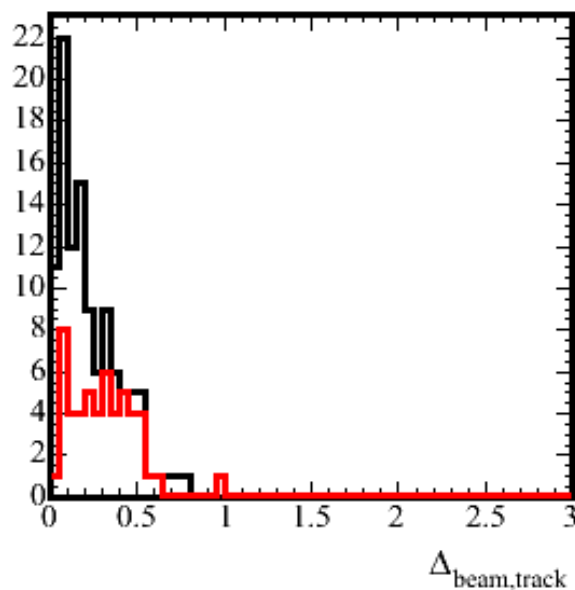
ADC counts in 18 microsecond trigger gate



MINOS

Track $\cos\theta$ 

Track Azimuth

 $\Delta_{\text{beam,track}}$ 

- Red events pass the contained vertex cuts
 - Black pass contained vertex cuts & all rock muon events that enter the front face of the detector
 - $\cos(\theta)$ distribution peaked above zero as expected since the beam points downward
 - Azimuth peaks at 150, which is the direction the beam/detectors face
- (preliminary)



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- Clear observations of beam-induced neutrinos and rock muons
 - Have a lot of beam tuning data to look at to check the beamline at a much higher level than last time
 - Kicker flattop studies data to check for multi-batch extraction (this time only single batch, but we did go up to a pulse or two at $4E12$ ppp)
 - Short horn current studies.
 - Need more horn studies data, got cut short.
 - VERY successful run!



MANY THANKS to everyone for all the help over many
years!!

The Lab, all our collaborators, all the support we have gotten from the
Divisions and Sections over the years...it has been a long road,
and now
we have many years of data to look forward to!